

EXERCISE IS POSITIVELY RELATED TO ADOLESCENTS' RELATIONSHIPS AND ACADEMICS

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ABSTRACT

Eighty-nine high school seniors were administered a questionnaire that gathered information on their exercise habits (ranging from rarely to daily), relationships with parents and peers, depressive tendencies, sports involvement, drug use, and academic performance. Students with a high level of exercise had better relationships with their parents (including greater intimacy and more frequent touching), were less depressed, spent more time involved in sports, used drugs less frequently, and had higher grade point averages than did students with a low level of exercise.

Students who are enrolled in physical education classes are spending more time performing physical activities, and they are engaging in strengthening and stretching activities at increasing rates. However, despite regular exercise by some, participation in daily school physical education has shown a decline, and the percentage of time spent in sedentary activities has not decreased (Francis, 1999).

Lack of exercise among young people has been found to contribute to obesity and health problems. The health benefits of exercise include a reduction in low-density lipoproteins and an increase in high-density lipoproteins, improvement in glucose metabolism, increased strength, and a reduction in sports-related injuries (Sothorn, Loftin, Suskind, Udall, & Blecker, 1999). Exercise has also been noted to improve cardiovascular fitness in children (Alpert, Field, Goldstein, & Perry, 1990).

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In addition, a moderate-intensity exercise program has been reported to have a beneficial effect on the immune system (Nieman & Pedersen, 1999). Specifically, moderate exercise was found to reduce the number of sick days. Enhancement of immune function may derive from the stress-reducing and stress-hormone-decreasing (i.e., cortisol) benefits of exercise.

Although lower levels of depression and anxiety have been reported for adults who engage in sports (Craft & Landers, 1998; Mutrie & Biddle, 1995), little is known about the effects of moderate exercise on depression and anxiety in adolescents. The effects of exercise on adolescents' interpersonal relationships and academic performance are even less understood. Thus, the present study investigated whether exercise contributes to adolescents' well-being, particularly in terms of more satisfactory relationships and better academic performance.

METHOD

Participants

The participants were 89 suburban high school seniors (52 females and 37 males). On average, they were of middle to upper middle socioeconomic status ($M = 3.9$ on the Hollingshead Two-Factor Index). Their ethnic distribution was as follows: 76% Caucasian, 11% Hispanic, 5% Asian, 3% African-American and 5% other.

Measures

The participants completed a 181-item Likert-type questionnaire on the following behavioral and psychological aspects of adolescent life (Field & Yando, 1991). Exercise was assessed on a 5-point Likert scale: rarely (1), sometimes (2), once a week (3), three or more times a week (4), daily (5). Adolescent depression was measured using the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). The CES-D has a range of 0–60, with a score greater than 16 indicating depression. The CES-D has been standardized for high school populations (Radloff, 1991) and has adequate test-retest reliability, internal consistency, and concurrent validity (Wells, Klerman, & Deykin, 1987). Quality of relationships with parents/friends (Blyth & Foster-Clark, 1987) was assessed on a 5-point Likert scale, ranging from not at all to very much. For example: "How much does your mother accept you no matter what you do?" Intimacy with parents (frequency of personal conversations, doing fun things together), touch (showing physical affection to parents or touching, and receiving physical affection from

parents or touching), and family support (closeness to siblings and other relatives) were also assessed. Maternal depression and paternal depression were assessed using a 4-point Likert scale. Drug use, specifically the use of cigarettes, alcohol, marijuana, and cocaine, was assessed via a 4-point Likert scale, ranging from never to regularly. Sports involvement was measured on a 3-point Likert scale, ranging from less than 2 hours per week spent on sports (1) to 7 or more hours per week (3). Grade point average was scored on a 4-point scale ranging from A to D.

RESULTS

A median split on the exercise variable was used to define high and low groups. The group with a high level of exercise included 36 adolescents (23 females and 13 males) and the low group had 53 adolescents (29 females and 24 males). A MANOVA was followed by ANOVAs on the specific variables (see Table 1).

The analyses suggested that adolescents in the high-exercise group had better relationships with their parents than did those in the low-exercise group. The high-exercise group reported higher quality relationships with parents, $F(1, 68) = 4.23, p < .05$; greater intimacy with parents, $F(1, 68) = 4.13, p < .05$; more frequent touching, $F(1, 68) = 4.26, p < .05$; and more family support, $F(1, 68) = 4.26, p < .05$. The high-exercise group also reported less depression, $F(1, 68) = 3.89, p < .05$; less maternal depression, $F(1, 68) = 5.81, p < .01$; and less paternal depression, $F(1, 68) = 4.52, p < .05$. In addition, the high-exercise group had a lower level of drug use (including alcohol, marijuana, and cocaine), $F(1, 68) = 8.15, p < .01$; engaged in sports more hours per week, $F(1, 68) = 8.92, p < .005$; and had higher grade point averages, $F(1, 68) = 5.82, p < .05$.

DISCUSSION

High levels of exercise were associated with better relationships with parents (i.e., quality, intimacy, and touching). The relationship between exercise and family support was not surprising inasmuch as Sallis et al. documented that those who regularly exercised received more social support for their exercise (Sallis, Calfas, Alcaraz, Gehrman, & Johnson, 1999; Sallis, Prochaska, Taylor, Hill, & Geraci, 1999). They reported that the most common reason given for discontinuing exercise was the absence of social support for exercise.

Table 1. Mean Scores and Significant Group Differences

Variable	Exercise Group		<i>p</i>
	High (<i>n</i> = 36)	Low (<i>n</i> = 53)	
Quality of Relationships with Parents	33.6	30.9	.05
Intimacy with Parents	16.1	14.9	.05
Touch	17.5	16.1	.05
Family Support	2.7	2.4	.05
Adolescent Depression	21.8	25.6	.05
Maternal Depression	1.3	1.7	.01
Paternal Depression	1.4	1.7	.05
Drug Use	2.0	2.6	.01
Sports Involvement	2.3	1.8	.005
Grade Point Average	3.3	2.9	.05

The lower level of depression in the high-exercise group was expected, although the direction of the relationship is not clear. Less depressed students may be inclined to exercise more, or more exercise may alleviate depression. Exercise has been noted to increase the body's natural serotonin levels, the chief ingredient in antidepressants (Nash, 1996). Although the amount of exercise engaged in by parents was not tapped by the questionnaire, levels of parent and child exercise have been found to be highly correlated in other studies (e.g., Alpert et al., 1990). Assuming that this was true in the present sample, the

lower depression found for the mothers and fathers of adolescents in the high-exercise group might also be explained by their own high levels of exercise.

The relationship between exercise and the number of hours per week spent on sports was expected. Those engaging in more sports are certainly getting more exercise, and, vice versa, those who are getting more exercise are more likely to be engaged in sports. Similarly, the negative relationship between exercise and drug use was not surprising, as taking drugs is not conducive to optimal athletic performance.

It is possible that the higher grade point averages for those in the high-exercise group are related to an increase in neurotransmitters, such as serotonin, associated with increased exercise. Exercise has been noted not only to increase serotonin levels, but also to increase performance on cognitive tasks (Nash, 1996). Better family relationships have also been found to correlate with greater academic achievement (Garber & Little, 1999).

The findings of the present study suggest that exercise is a positive activity for adolescents in many respects. Better relationships with parents—which in other studies (e.g., Field, Lang, Yando, & Bendell, 1995) have been noted to be important for adolescents' happiness—lower levels of drug use, and better academic performance were found for the high-exercise group. These positive effects, combined with reductions in low-density lipoproteins and increases in high-density lipoproteins (Sothorn et al., 1999), highlight the importance of efforts by parents and schools to reinforce adolescents' exercise habits.

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